

Claims

- [c1] 1. A distributed system for acquiring remote data in packets with a communication protocol optimizing the transmission speed, particularly applicable to the follow-up and control in an automotive vehicle of the values of signals provided by a series of transducer devices (1, 2, 3, 4) distributed in different parts of the vehicle and which follow different analog or digital values, characterized in that said transducer devices (1, 2, 3, 4) are associated to respective slave/subordinate circuits (10, 20, 30, 40) which are connected, through a single, time-shared serial communications bus (60), to a master/main circuit (50), which in turn is connected to a digital processing unit (DP) through a parallel bus (70), each one of said slave circuits (10, 20, 30, 40) and master circuit (50) being provided with a respective digital processor (SLV1, SLV2, SLV3, SLV4, MST) and a respective transceiver device (11, 21, 31, 41, 51), and which master circuit (50) is provided so as to perform, upon petition of an activation by said unit (DP), a repetitive or non-repetitive consultation, setting up communication with each one of the slave/subordinate circuits (10, 20, 30, 40) according to a communication protocol without error correction which

includes a series of bit packets (P1, P2, P3, P4), each one of which comprises:

a start bit (START) with a longer duration/length than the data bits so that it is fully identified;

1.5 delay/synchronism bits (SYNC) for the frames going from master to slave;

one or more (according to the number of slave devices present in the system) address bits (A1, A0), indicative of the slave/subordinate device (10, 20, 30, 40) to be consulted; and

several data bits (D0...Dn) containing information coming from the consulted slave device (10, 20, 30, 40).

[c2] 2. A system according to claim 1, characterized in that said start bit (START) of each bit packet (P1, P2, P3, P4), with a longer duration/length than the data bits, is provided so as to generate a re-initialization of all the slave circuits (10, 20, 30, 40).

[c3] 3. A system according to claim 1, characterized in that said start bit (START) of each bit packet (P1, P2, P3, P4) has a duration of at least two times that of each one of the data bits of the packet.

[c4] 4. A system according to claim 1, characterized in that each bit of the packet in address, data or error detection functions, is encoded in Manchester format.

- [c5] 5. A system according to claim 1, characterized in that each bit packet(P1, P2, P3, P4) includes an additional protocol error detection bit (DET) in the data field or address field.
- [c6] 6. A system according to claim 5, characterized in that said error detection bit (DET) is the last one of each packet (10, 20, 30, 40).
- [c7] 7. A system according to claim 1, characterized in that said short time interval (t1) of separation between bit packets (P1, P2, P3, P4) circulating through the serial bus (60) is comprised within a range of 0 to 1 bit.
- [c8] 8. A system according to claim 1, characterized in that said serial bus (60) is formed by a twisted differential cable comprising two twisted insulated copper conductors (61, 62) in shunt with a ground line (64).
- [c9] 9. A system according to claim 1, characterized in that said serial bus (60) is formed by a single insulated copper conductor (63) in shunt with a ground line (64).
- [c10] 10. A system according to claim 1, characterized in that each one of those transducer devices (1, 2, 3, 4) providing an analog signal is associated to an A/D converter (12, 22, 32, 42) connected to the corresponding slave-

transceiver circuit (SLV1–11, SLV2–21, SLV3–31, SLV4–41).

- [c11] 11. A system according to claim 1, characterized in that said digital processing unit (DP) is linked to another bus of the vehicle, such as a CAN or other type of bus.
- [c12] 12. A system according to claim 1, characterized in that each bit packet (P1, P2, P3, P4) contains, in addition to said one or more address bits (A1, A0), data bits (I0–In) susceptible to being transmitted from the master circuit (50) to the consulted slave circuit (10, 20, 30, 40), such that they are univocally recognized by the same.
- [c13] 13. A process for acquiring remote data in packets with a communication protocol optimizing the transmission speed, particularly applicable to the follow-up and control in an automotive vehicle of the values of signals provided by a series of transducer devices (1, 2, 3, 4) distributed in different parts of the vehicle and which follow different analog or digital values, integrated in a system according to claim 1, characterized in that:
said master circuit (50), upon petition of the application thereto of a signal (wr) emitted by said digital processing unit (DP), performs a repetitive or non-repetitive consultation of each one of the slave/subordinate circuits (10, 20, 30, 40) through the parallel bus (70), setting up

communication with them through said time-shared serial bus (60) by means of said bit packets (P1, P2, P3, P4) according to said transmission protocol without error correction;

the slave circuits (10, 20, 30, 40) transmit said data bits (D1...Dn) in response to said consultation, which data are stored in said master circuit (50) in arrayed entries;

the master circuit (50) sends an interruption order through a parallel bus (70), by means of the activation of a signal (int), to the digital processing unit (DP) indicative of the end of the consultation cycle; and

the digital processing unit (DP) acquires, by means of the activation of a reading order (rd), the data bits (D1...Dn) stored in the master circuit (50) while the system continues with a new consultation communication between the master circuit and the slave circuits (10, 20, 30, 40).

[c14] 14. A process according to claim 13, characterized in that said consultation cycles between master circuit (50) and slave circuits (10, 20, 30, 40) and acquisition of data stored in the master circuit (50) from the digital processing unit (DP) are carried out cyclically at a predetermined frequency imposed by said digital processing unit (DP).

[c15] 15. A process according to claim 13, characterized in that those bit packets (P1, P2, P3, P4) whose transmission has been detected as erroneous by means of said

error detection bit (DET) are skipped over, passing to the next bit packets (P1, P2, P3, P4).